AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A speech coding apparatus for coding an input speech on a frame-by-frame basis using an adaptive excitation source, which is generated from a past excitation source, and a driving excitation source, which is generated from the input speech and the adaptive excitation source, so as to generate speech code, said speech coding apparatus comprising:

a repetition period pre-selecting means for generating a plurality of candidates for a repetition period of the driving excitation source by multiplying a repetition period of the adaptive excitation source by a plurality of constant numbers, respectively, and for pre-selecting a predetermined number of candidates from all the candidates generated and furnishing the predetermined number of pre-selected candidates;

a driving excitation source coding means for providing both excitation source location information and excitation source polarity information that minimize a coding distortion, for each of the predetermined number of candidates for the repetition period of the driving excitation source, and for providing an

evaluation value associated with the minimum coding distortion for each of the predetermined number of candidates; and

a repetition period coding means for comparing the evaluation values provided for the predetermined number of candidates for the repetition period of the driving excitation source from said driving excitation source coding means with one another, for selecting one candidate from the predetermined number of candidates according to a comparison result, and for furnishing selection information indicating a selection result, excitation source location code indicating excitation source location information associated with the selected candidate for the repetition period of the driving excitation source, and polarity code indicating excitation source polarity information associated with the selected candidate.

2. (Original) The speech coding apparatus according to Claim 1, wherein said repetition period pre-selecting means pre-selects two candidates from all the candidates generated, and said repetition period coding means encodes the selection result in one bit so as to generate 1-bit selection information.

3. (Original) The speech coding apparatus according to Claim 1, wherein said repetition period pre-selecting means

includes a means for comparing the repetition period of the adaptive excitation source with a predetermined threshold value, and for pre-selecting the predetermined number of candidates from all the candidates generated according to a comparison result.

4. (Original) The speech coding apparatus according to Claim 1, wherein said repetition period pre-selecting means includes a means for generating a plurality of other adaptive excitation sources whose respective repetition periods equal to the plurality of candidates for the repetition period of the driving excitation source, respectively, and for pre-selecting the predetermined number of candidates from all the candidates generated according to a comparison between distances among the plurality of other adaptive excitation sources generated.

5. (Original) The speech coding apparatus according to Claim 1, wherein said plurality of constant numbers, by which the repetition period of the adaptive excitation source is multiplied, includes 1/2 and 1.

6. (Original) A speech decoding apparatus for decoding input speech code on a frame-by-frame basis using an adaptive

excitation source, which is generated from a past excitation source, and a driving excitation source, which is generated from the input speech code and the adaptive excitation source, so as to reconstruct original speech, said speech decoding apparatus comprising:

a repetition period pre-selecting means for providing a plurality of candidates for a repetition period of the driving excitation source by multiplying a repetition period of the adaptive excitation source by a plurality of constant numbers respectively, and for pre-selecting a predetermined number of candidates from all the candidates generated and furnishing the predetermined number of pre-selected candidates;

a repetition period decoding means for selecting one candidate from the predetermined number of pre-selected candidates for the repetition period of the driving excitation source from said repetition period pre-selecting means according to selection information included in said input coded speech and indicating the selection, and for furnishing the selected candidate as the repetition period of the driving excitation source; and

a driving excitation source decoding means for generating a time-series signal according to excitation source location code and excitation source polarity code included in the input speech

code, and for generating a time-series vector that is a series of pitch-cycles, each of which includes the time-series signal, using the repetition period of the driving excitation source from said repetition period decoding means.

7. (Original) The speech decoding apparatus according to Claim 6, wherein said repetition period pre-selecting means pre-selects two candidates from all the candidates generated, and said repetition period decoding means decodes selection information coded in one bit, which is included in the input speech code and indicates a selection of a candidate for the repetition period of the adaptive excitation source made during coding.

8. (Original) The speech decoding apparatus according to Claim 6, wherein said repetition period pre-selecting means includes a means for comparing the repetition period of the adaptive excitation source with a predetermined threshold value, and for pre-selecting the predetermined number of candidates from all the candidates generated according to a comparison result.

9. (Original) The speech decoding apparatus according to Claim 6, wherein said repetition period pre-selecting means includes a means for generating a plurality of other adaptive excitation sources whose respective repetition periods equal to the plurality of candidates for the repetition period of the driving excitation source, respectively, and for pre-selecting the predetermined number of candidates from all the candidates generated according to a comparison between distances among the plurality of other adaptive excitation sources generated.

10. (Original) The speech decoding apparatus according to Claim 6, wherein the plurality of constant numbers, by which the repetition period of the adaptive excitation source is multiplied, includes 1/2 and 1.

11. (Currently Amended) A speech coding apparatus for coding an input speech on a frame-by-frame basis using an adaptive excitation source, which is generated from a past excitation source, and a driving excitation source, which is generated from the input speech and the adaptive excitation source, so as to generate speech code, said speech coding apparatus comprising:

a perceptual weighting control means for determining a perceptual weighting strength coefficient based on a repetition period of the adaptive excitation source; and

a driving excitation source coding means for filtering a signal to be coded using the perceptual weighting strength coefficient and generating excitation source location code indicating information about excitation source locations and information about excitation source polarities based on the repetition period of the adaptive excitation source, the perceptual weighting strength coefficient determined by said perceptual weighting control means, and a signal to be coded ~~such as the input speech~~.

12. (Original) The speech coding apparatus according to Claim 11, wherein said perceptual weighting control means determines the perceptual weighting strength coefficient based on an average of the repetition period of the current adaptive excitation source and repetition periods of previously-generated adaptive excitation sources.

13. (Original) A speech coding apparatus for coding an input speech on a frame-by-frame basis using an adaptive excitation source, which is generated from a past excitation

source, and a driving excitation source generated from the input speech and the adaptive excitation source, said driving excitation source being represented by locations and polarities of a plurality of excitation sources, so as to generate speech code, said speech coding apparatus comprising:

an excitation source location table including a plurality of selectable possible locations and a fixed magnitude determined based on the number of the plurality of possible locations for each of the plurality of excitation sources;

a driving excitation source coding means for placing the plurality of excitation sources at respective possible locations while multiplying each of the plurality of excitation sources by a corresponding fixed magnitude, with reference to said excitation source location table, for generating a driving excitation source by calculating a sum of the plurality of excitation sources each of which has been multiplied by the corresponding fixed magnitude and is thus placed at one corresponding possible location, for each of all combinations of possible locations of the plurality of excitation sources, and for selecting possible locations and polarities of the plurality of excitation sources which provide a driving excitation source having a smallest coding distortion between itself and the input

speech so as to generate excitation source location code and polarity code.

14. (Original) A speech decoding apparatus for decoding input speech code on a frame-by-frame basis using an adaptive excitation source, which is generated from a past excitation source, and a driving excitation source generated from the input speech code and the adaptive excitation source, said driving excitation source being represented by locations and polarities of a plurality of excitation sources, so as to reconstruct original speech, said speech decoding apparatus comprising:

an excitation source location table including a plurality of selectable possible locations and a fixed magnitude determined based on the number of the plurality of possible locations for each of the plurality of excitation sources;

a driving excitation source decoding means for selecting respective possible locations for the plurality of excitation sources with reference to said excitation source location table based on excitation source location code included in the input speech code, for placing the plurality of excitation sources at the respective selected possible locations while multiplying each of the plurality of excitation sources by a corresponding fixed magnitude, and for generating a driving excitation source

by calculating a sum of the plurality of excitation sources each of which has been multiplied by the corresponding fixed magnitude and is thus placed at the corresponding possible location.

15. (Currently Amended) A speech coding apparatus for coding an input speech on a frame-by-frame basis using an adaptive excitation source, which is generated from a past excitation source, and a driving excitation source generated from the input speech and the adaptive excitation source, said driving excitation source being represented by locations and polarities of a plurality of excitation sources, so as to generate speech code, said speech coding apparatus comprising:

a pre-table calculating means for calculating a correlation between a signal to be coded~~, such as the input speech,~~ and each of a plurality of synthesized speeches each of which is generated based on a corresponding temporary driving excitation source that is a signal obtained by placing a predetermined excitation source at a corresponding one of all possible locations, and a cross-correlation between any two of the plurality of synthesized speeches, and for storing these calculated correlations and cross-correlations as a pre-table therein;

a pre-table modifying means for calculating a correlation between the signal to be coded and a synthesized speech generated based on the adaptive excitation source, and a correlation between each of the plurality of synthesized speeches generated based on the corresponding temporary driving excitation source and the synthesized speech generated based on the adaptive excitation source, and for modifying said pre-table using these calculated correlations; and

a searching means for determining the locations and polarities of the plurality of excitation sources using the pre-table corrected by said pre-table modifying means so as to generate excitation source location code indicating the locations of the plurality of excitation sources and excitation source polarity code indicating the polarities of the plurality of excitation sources.

16. (New) The speech coding apparatus of claim 11, the driving excitation source coding means including a perceptual weighting filter, wherein the perceptual weighting control means uses the repetition period of the adaptive excitation source to classify the input speech as one of male and female speech, and adjusts a strength of the perceptual weighting filter based on this classification of the input speech.

17. (New) The speech coding apparatus of claim 16, wherein the perceptual weighting control means determines the perceptual weighting strength coefficient in order to:

decrease the strength of the perceptual weighting filter when the input speech is classified as male speech, and

increase the strength of the perceptual weighting filter when the input speech is classified as female speech.

18. (New) The speech coding apparatus of claim 16, wherein the perceptual weighting control means compares the repetition period of the adaptive excitation source to a threshold in order to classify the input speech as one of male and female speech.

19. (New) The speech coding apparatus of claim 11, wherein

a linear prediction coefficient, which is generated for the input speech, is used to calculate a perceptual weighting filter coefficient,

the perceptual weighting filter coefficient is multiplied by the perceptual weighting strength coefficient, and

the driving excitation source coding means includes a perceptual weighting filter, which uses the multiplied

perceptual weighting filter coefficient to generate a filtered signal.

20. (New) The speech coding apparatus of claim 11, wherein the signal to be coded is at least one of: the input speech, and a synthesized signal generated from the input speech.

21. (New) The speech coding apparatus of claim 15, wherein the signal to be coded is at least one of: the input speech, and a synthesized signal generated from the input speech.

22. (New) A speech coding method for coding input speech on a frame-by-frame basis using an adaptive excitation source and a driving excitation source, comprising:

determining a plurality of candidate repetition periods for the driving excitation source, each representing one of a plurality of predetermined constant numbers multiplied by a repetition period of the adaptive excitation source; and

selecting at least one of the candidate repetition periods; and

generating excitation source information corresponding to the selected candidate repetition period and a signal representative of the input speech.

23. (New) The speech coding method of claim 22, wherein the selecting step further comprises:

preselecting a predetermined number of candidate repetition periods, said predetermined number being greater than one;

calculating, for each of the predetermined number of candidate repetition periods, an evaluation value using excitation source information generated for that candidate repetition period; and

selecting one of the predetermined number of candidate repetition periods based on the evaluation values.

24. (New) The speech coding method of claim 23, wherein the one of the predetermined number of candidate repetition periods, which is determined to be a closest estimate of the pitch period of input speech by the evaluation values, is selected.

25. (New) The method of claim 23, wherein

the plurality of predetermined constant numbers include 1 along with other constant numbers, such that the repetition period of the adaptive excitation source is one of the determined candidate repetition periods, and

the preselecting step includes:

multiplying the repetition period of the adaptive excitation source by the other constant numbers to determine other candidate repetition periods;

obtaining adaptive excitation sources corresponding to each of the candidate repetition periods, wherein a past excitation source stored in an adaptive excitation source codebook is obtained for the repetition period of the adaptive excitation source; and

determining a difference between the past excitation source and each of the adaptive excitation sources corresponding to the other candidate repetition periods, the determined differences being used to preselect the predetermined number of candidate repetition periods.

26. (New) A speech coding method for coding input speech on a frame-by-frame basis, comprising:

generating an adaptive excitation source from a past excitation source;

determining a perceptual weighting strength coefficient based on a repetition period of the adaptive excitation source;

filtering a signal representative of the input speech based on the perceptual weighting strength coefficient; and

generating a driving excitation source based on the filtered signal.

27. (New) The method of claim 26, wherein the determining step further comprises:

classifying the input speech as one of male and female speech based on the repetition period of the adaptive excitation source;

increasing the perceptual weighting strength coefficient if the input speech is classified as female speech; and

decreasing the perceptual weighting strength coefficient if the input speech is classified as male speech.

28. (New) The method of claim 27, wherein the classifying step compares the repetition period of the adaptive excitation source to a threshold in order to classify the input speech as one of male and female speech.

29. (New) The method of claim 27, wherein the classifying step further comprises:

updating an average of repetition periods of previous adaptation excitation sources using the repetition period of the current adaptation excitation source;

comparing the updated average of repetition periods to a threshold in order to classify the input speech as one of male and female speech.

30. (New) The method of claim 26, wherein the filtering step further comprises:

determining a perceptual weighting filter coefficient using a linear prediction coefficient corresponding to the input speech;

multiplying the perceptual weighting filter coefficient by the perceptual weighting strength coefficient; and

applying the signal representative of the input speech to a perceptual weighting filter, which uses the multiplied perceptual weighting filter coefficient, thereby generating the filtered signal.